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REPORTS

DATE:

2002

Duke Energy Field Services

DUKE C-LINE 50602

SITE CHARACTERIZATION AND CLOSURE PROPOSAL FOR SOIL SUPPORTED BY VADSAT RISK ASSESSMENT

UL-O SW¼ of the SE¼, Section 31, T20S, R37E
Latitude 32°31'29.689"N - Longitude 103°17'11.654"W
~3 miles northwest of Oil Center
Lea County, New Mexico

AUGUST 2002

PREPARED BY

ENVIRONMENTAL PLUS, INC.
EUNICE, NEW MEXICO

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1.0 SUMMARY

Duke Energy Field Services contracted Environmental Plus, Inc. (EPI) of Eunice, New Mexico to delineate the extent of pipeline fluid contamination and remediate the C-Line 50602 site in accordance with the New Mexico Oil Conservation Division (NMOCD) Guidelines for Remediation of Leaks, Spills and Releases (August 13, 1993). The initial form C-141 submitted to the NMOCD by DUKE reported 70 barrels (bbls) of pipeline fluid released with a recovery of 50 bbls. The C-Line is part of the DUKE gas gathering system and as such is exempt from the EPA Resource Conservation and Recovery Act 40 CFR (RCRA) Subtitle C hazardous waste characterization requirements. The ground water depth at the site is 93 feet below ground surface ('bgs) and is based on water level measurements of a temporary monitor well installed adjacent to the leak origin. An abandoned windmill well bore at a similar elevation approximately 1,075 feet to the southeast was measured to have a water level of 114'bgs. Site ranking thresholds for the "Constituents of Concern" (CoCs) are:

Soil from the surface to 43'bgs

- 1000 mg/Kg = Total Petroleum Hydrocarbon EPA method 8015m (TPH^{8015m})
- 10 mg/Kg = Benzene
- 50 mg/Kg = BTEX (mass sum of Benzene, Toluene, Ethyl Benzene, and m, o, & p Xylenes)
- 250 mg/Kg = Chloride

Soil from 43'bgs to 93'bgs

- 100 mg/Kg = Total Petroleum Hydrocarbon EPA method 8015m (TPH^{8015m})
- 10 mg/Kg = Benzene
- 50 mg/Kg = BTEX (mass sum of Benzene, Toluene, Ethyl Benzene, and m, o, & p Xylenes)
- 250 mg/Kg = Chloride

All soil contaminated above these thresholds down to 18'bgs has been excavated and remediated to acceptable CoC levels. A total contaminated soil volume of approximately 3,868 cubic yards (yd^3) of soil was removed with approximately 2,707 yd^3 disposed of in the New Mexico Oil Conservation Division (NMOCD) approved and permitted South Monument Solid Waste Management Facility #NM-01-0032 with the remainder, approximately 1,161 yd^3 blended with clean soil and mechanical aerated by shredding.

The release occurred in the 8" steel C-Line which is the west most pipeline in a 3 line gallery. The center line was inactive while the east most 20" steel line was in use. The decision was made, after excavating the west leak origin to approximately 16'bgs, to advance and sample a soil boring (BH1 also referred to as CBH) beneath the origin to determine the vertical extent. Volatile Organic (VOC) headspace data collected with a calibrated Photoionization Detector (PID) indicated the vertical extent at this location to be 51'bgs. VOC headspace data from the west sidewall were all <100 ppm and deemed acceptable. In an effort to establish the eastward horizontal extent of contamination, a second borehole (BH2 also referred to as EBH) was advanced and sampled approximately 26 feet east of the leak origin and 9 feet east of the 20" line. Samples were collected at 5' intervals and VOC headspace analyzed down to 90'bgs. The 5'bgs and 80'bgs samples were <100 ppm VOC with all others down to the saturated zone >100 ppm VOC with the highest reading of 1,246 ppm occurring in the 45'bgs sample. The borings were advanced with a hollow stem auger and "AW" rod and samples collected discretely using a decontaminated soil probe with a clean vinyl sampling sleeve. A temporary monitoring well was installed in BH2 to verify ground water impact. After development, product was measured at 89.5'bgs with ground water at 92.8'bgs, i.e., 3.3 feet

of product. Total depth of the well is 94.4'bgs. Duke immediately notified the Hobbs and Santa Fe offices of the NMOCD of the ground water impact. It was concluded, based on information from BH2, that a historical leak had occurred at the site. Subsequently, the three lines were shut-in and looped around the site and the pipe removed to accommodate safe removal of contaminated soil. An area of approximately 6,475 square feet (ft^2) was excavated down to 18'bgs and the horizontal impact delineated.

The hydrocarbon source term at this site is an extremely volatile and odorous condensate with a specific gravity of 0.6944. Because of the volatility of the soil samples and the high ambient temperatures during sampling, sample quality was compromised, i.e., laboratory results showed only nominal CoC concentrations above the instrument detection limits for samples with VOC headspace concentrations >1000 ppm. For this reason site delineation relies primarily on field VOC headspace analyses.

A conservatively estimated, 3,489 cubic yards (yd^3) remains in the subsurface and is represented by a column approximately 22' in diameter and 75' long. It is proposed to isolate the remaining source term with an impermeable barrier constructed of dense compactable red clay with a minimum permeability of $1x10^{-5}$ cm/sec. The barrier will extend 8 to 10 feet beyond the column perimeter at the 18'bgs interval and be at least 1 foot thick. The barrier will be installed in 6-inch lifts and compacted and tested to verify compaction to at least 95% of its' Proctor density. Installation at the 18'bgs interval can be done safely and will serve to protect the engineered barrier from erosion and human intrusion. To support this alternative, a conservative risk/exposure assessment was conducted using the VADSAT Version 3.0, A Monte Carlo Model for Assessing the Effects of Soil Contamination on Groundwater Quality, developed by: Environmental Systems and Technologies Inc., Blacksburg, Virginia for the American Petroleum Institute in 1995. The analytical information collected and the viable and supportive VADSAT risk/exposure assessment supports approval of this closure proposal addressing soil contamination at the Duke C-Line 50602 site. Following implementation of this proposal a thorough ground water investigation will be proposed and implemented. Based on the information collected during the ground water investigation, a viable ground water remediation plan will proposed and implemented.

2.0 SITE DESCRIPTION

The property is owned by State of New Mexico and located ~7 miles south of Monument, Lea County, New Mexico. Duke secured Right of Entry Permit #669. The DUKE site is known as the "C-Line 50602." An abandon tank battery and pit feature are located approximately 200 feet northeast of the site.

2.1 HISTORICAL USE

The area has been used historically for livestock grazing and access to oil and gas production facilities.

2.2 LEGAL DESCRIPTION

The legal description of the site is Unit Letter - O SW¼ of the SE¼ Section 31, T20S, R37E at latitude 32°31'29.689"N and longitude 103°17'11.654"W. Site elevation is ~3,540 feet above mean sea level.

2.3 PHOTOGRAPHIC DOCUMENTATION

Photographs are provided in Attachment II.

2.4 ECOLOGICAL DESCRIPTION

The area is typical of the Upper Chihuahuan Desert Biome consisting primarily of hummocky sand dunes interspersed with Honey Mesquite (Prosopis glandulosa), Harvard Shinoak (Querqus harvardii), and typical desert grasses. Mammals represented include Orrd's and Merriam's Kangaroo Rat, Deer Mouse, White

Throated Wood Rat, Cottontail Rabbit, Black Tailed Jackrabbit, Pronghorn Antelope, and the Mule Deer. Reptiles, Amphibians, and Birds are numerous and typical of area. A survey of Listed, Threatened, or Endangered species was not conducted. The site surface trends to the southeast.

3.0 Environmental Media Characterization

Chemical parameters of the soil and ground water will be characterized consistent with the New Mexico Oil Conservation Division (NMOCD) guidelines published in the following documents as applicable;

- Guidelines for Remediation of Leaks, Spills and Releases (August 13, 1993)
- Unlined Surface Impoundment Closure Guidelines (February 1993)

Acceptable thresholds for contaminants of concern (CoCs), i.e., TPH and BTEX are determined based on the following;

- Depth to Ground water, i.e., distance from the lower most acceptable concentration to the ground water.
- Wellhead Protection Area, i.e., distance from fresh water supply wells.
- Distance to Surface Water Body, i.e., horizontal distance to down gradient surface water bodies.

However, site specific risk based thresholds may be developed.

3.1 Area Ground Water Levels

The locally measured water levels are consistent with those on record with the New Mexico State Engineers Office and occurs at 93 'bgs. An abandoned windmill well 1,075 feet southeast of the site has a measured water level of 114'bgs.

3.2 Depth to Ground Water Calculation

The NMOCD requires the site be ranked to determine which soil TPH^{8015m}, Benzene, and BTEX thresholds apply and defines depth to ground water as, "the vertical distance from the lowermost contaminants to the seasonal high water elevation of the ground water." The uppermost occurrence of ground water is at ~93.0'bgs. The lower most contamination occurs conservatively at 93'bgs. The calculated NMOCD depth to ground water is essentially 0.0' bgs.

3.3 Ground Water Gradient

The ground water dip/gradient is generally to the southeast according the USGS Ground Water Report #6, Nicholson and Clebsch, 1961.

3.4 Wellhead Protection Area

There are no water wells within 200 horizontal feet of the site.

3.5 Distance to Nearest Surface Water Body

None present.

3.6 Identification of Remedial Action Levels

Remedial goals for soil in this area are determined in accordance with NMOCD Guidelines. The NMOCD depth to ground water is calculated to be 0.0'bgs.

3.6.1 Site Ranking

The area has the following score and site ranking;

NMOCD Depth to Groundwater / 50 to 99' = 10 (20 for soils within 50 feet)
Wellhead Protection Area / >200' = 0
Distance to Surface Water Body / >200' = 0
Site Ranking = 10 (20)

3.6.2 Remedial Action Levels

The remedial action objectives for soil at this site according to the NMOCD guidelines are as follows.

Total Site Ranking Score and Acceptable Concentrations			
Parameter	**>19 (43' to 93'bgs)**	**10-19 (surface to 43'bgs)**	0-9
Benzene[1]	**10 ppm**	**10 ppm**	10 ppm
BTEX[1]	**50 ppm**	**50 ppm**	50 ppm
TPH	**100 ppm**	**1000 ppm**	5000 ppm
[1]100 ppm field VOC headspace measurement may be substituted for lab analysis			

The New Mexico Water Quality Control Commission (WQCC) ground water Maximum Contaminant Levels for the CoCs will apply to site ground water.

- TPH – no standard
- Benzene – 0.01 mg/L
- Toluene – 0.75 mg/L
- Ethyl Benzene – 0.75 mg/L
- m, p, o-Xylene – 0.62 mg/L
- Chloride – 250 mg/L

4.0 SITE DELINEATION

The release occurred in the 8" steel C-Line which is the west most pipeline in a 3 line gallery. The center line was inactive while the east most 20" steel line was in use. Initially, delineation strategy was to sample the excavation, however, at 16'bgs it was decided to advance and sample a borehole immediately beneath the leak origin and east of the 20" line to determine horizontal impact.

4.1 LEAK ORIGIN EXCAVATION

The decision was made, after excavating the west leak origin to approximately 16'bgs, to advance and sample a soil boring (BH1 also referred to as CBH) beneath the origin to determine the vertical extent. Volatile Organic (VOC) headspace data collected with a calibrated Photoionization Detector (PID) indicated the vertical extent at this location to be 51'bgs. VOC headspace data from the west sidewall were all <100 ppm and deemed acceptable. In an effort to establish the eastward horizontal extent of contamination, a second borehole (BH2 also referred to as EBH) was advanced and sampled approximately 26 feet east of the leak origin and 9 feet east of the 20" line. Samples were collected at 5' intervals and VOC headspace analyzed down to 90'bgs. The 5'bgs and 80'bgs samples were <100 ppm VOC with all others down to the saturated zone were >100 ppm VOC with the highest reading of 1,246 ppm occurring in the 45'bgs sample. The borings were advanced with a hollow stem auger and "AW" rod and samples collected discretely using a decontaminated soil probe with a clean vinyl sampling sleeve. A temporary monitoring well was installed in BH2 to verify ground water impact. After development, product was measured at 89.5'bgs with ground water at 92.8'bgs, i.e., 3.3 feet of product. Total depth of

the well is 94.4'bgs. Duke immediately notified the Hobbs and Santa Fe offices of the NMOCD of the ground water impact. It was concluded, based on information from BH2, that a historical leak had occurred at the site. Subsequently, the three lines were shut-in and looped around the site and the pipe removed to accommodate safe removal of contaminated soil. An area of approximately 6,475 square feet (ft^2) was excavated down to 18'bgs and the horizontal impact delineated. The borehole sampling and excavation maps are included in Attachment I. Excavation sidewall and bottom samples were collected on June 10, 2002. The VOC headspace data and laboratory reports are included in Attachment IV along with charts and summaries.

The hydrocarbon source term at this site is an extremely volatile and odorous condensate with a specific gravity of 0.6944. Because of the volatility of the soil samples and the high ambient temperatures during sampling, sample quality was compromised, i.e., laboratory results showed only nominal CoC concentrations above the instrument detection limits for samples with VOC headspace concentrations >1000 ppm. For this reason site delineation relies primarily on VOC headspace analyses.

4.2 Excavation Sidewalls and Bottom

On June 10, 2002, excavation sidewall and bottom 5-point composite samples were collected. Laboratory analysis of the North, South, East, and West sidewall samples were all below the instrument detection limits for BTEX and only nominal detection for TPH^{8015m}. A VOC headspace survey of grab samples from the excavation bottom indicates that the top of the contaminated soil is approximately 20' in diameter and centered around BH2. Chloride analysis of selected samples were all <250 mg/Kg. All analytical results are summarized with the original laboratory reports in Attachment IV.

5.0 Soil Remediation

The excavated soil was processed through a shredder to mechanically aerate and promote volatilization of the hydrocarbons. To verify effectiveness, on June 4, 2002, grab samples of the excavated soil and the processed soil were collected and sent to the lab for analysis. The analytical results indicate that the process reduced the TPH^{8015m} concentration in the soil from 897 mg/Kg to <10.0 mg/Kg but more importantly reduced the BTEX from an unacceptable 85.940 mg/Kg to an acceptable 0.485 mg/Kg.

6.0 Ground Water Remediation

Ground water is known to be impacted at the site, to what extent will be determined during implementation of a ground water investigation plan to be submitted to the NMOCD for review and consensus. A ground water remediation plan will be developed based on the investigation information and implemented upon approval by the NMOCD.

7.0 Closure Proposal for Site Soil

Approximately 3,489 cubic yards (yd^3) of contaminated soil remains in the subsurface and is represented conservatively by a vertical column/pipe approximately 22' in diameter and 75' long. It is proposed to isolate the remaining source term with an impermeable barrier constructed of dense compactable red clay with a minimum permeability of $1x10^{-5}$ cm/sec. The barrier will extend 8 feet beyond the column perimeter at the 18'bgs interval and be at least 1 foot thick. The barrier will be installed in 6-inch lifts and compacted and tested to verify that it has been compacted to at least 95% of its' Proctor density. Installation at the 18'bgs interval can be done safely and will serve to protect the engineered barrier from erosion and human intrusion for a term sufficient to allow natural attenuation of the CoCs to acceptable levels. After the barrier is installed and tested to be acceptable, the excavation will be backfilled with the remediated soil. Prior to being placed in the excavation, a Headspace Volatile Organic Constituent (VOC)

analyses will be conducted on a composite sample from each 100 cubic yard batch. Acceptable Headspace VOC readings will be 100 ppm or less. To support this alternative, a conservative risk/exposure assessment was conducted using the VADSAT Version 3.0, A Monte Carlo Model for Assessing the Effects of Soil Contamination on Groundwater Quality, developed by: Environmental Systems and Technologies Inc., Blacksburg, Virginia for the American Petroleum Institute in 1995. The analytical information collected and the viable and supportive VADSAT risk/exposure assessment supports approval of this closure proposal addressing residual soil contamination at the Duke C-Line 50602 site.

8.0 RISK/EXPOSURE ASSESSMENT

To support and justify the closure proposal in Section 7.0, a conservative risk/exposure assessment was conducted using the VADSAT Version 3.0, A Monte Carlo Model for Assessing the Effects of Soil Contamination on Groundwater Quality, developed by: Environmental Systems and Technologies Inc., Blacksburg, Virginia for the American Petroleum Institute in 1995.

8.1 CONTAMINATED SOIL DISTRIBUTION

It was determined that the contaminated soil column was approximately 22 feet in diameter at the 18'bgs interval, i.e., bottom of the excavation and extends to 93'bgs, the interface between the vadose and saturated zones, and represents approximately 3,489 yd^3.

8.2 ENGINEERED BARRIER

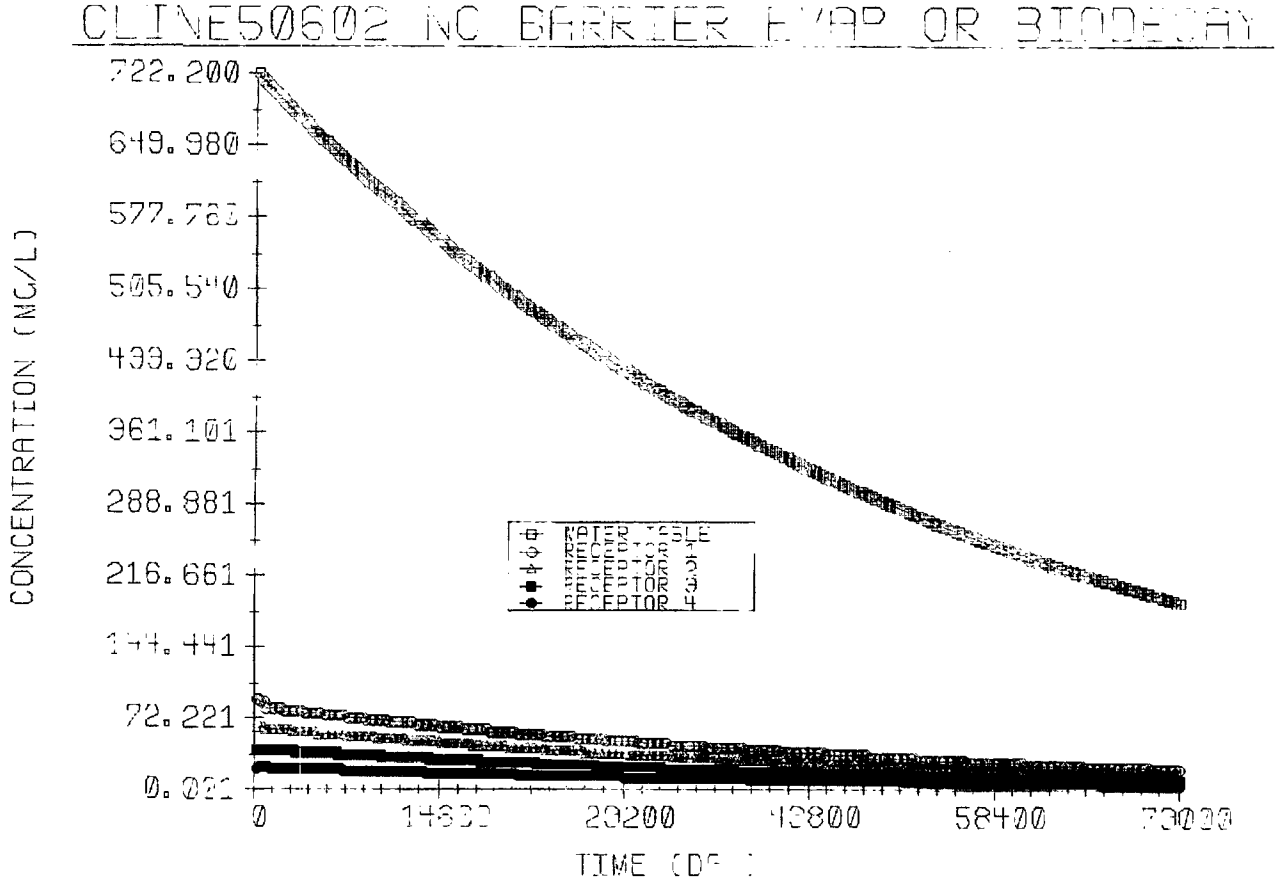
The proposed compacted clastic clay barrier will extend at least 8 feet beyond the contaminated soil perimeter in the bottom of the excavation and be at least 12" thick following compaction and be installed in two 6-inch layers. The oversized barrier will obviate transverse migration of the hydrocarbon source term. The clay will have a minimum permeability of $1x10^{-5}$ cm/sec. Acceptable compaction must be greater than 95.0% of its Proctor Density. The barrier will be installed from the 17-18'bgs interval and will be sufficiently isolated to ensure that the barrier will not be eroded or penetrated inadvertently by human activity. A conservative ground water risk/exposure assessment was conducted to demonstrate the effectiveness of the clay barrier in preventing future ground water impact by isolating the remaining hydrocarbon source term and interrupting the vertical migration pathway. Refer to diagram in Attachment I.

8.3 CONSERVATIVE MODEL INPUTS

The Monte Carlo probabilistic method was not used to simulate transport and subsequent ground water impact/exposure; rather, simulations were conducted deterministically. Input parameters/variables are included as Attachment V. The most conservative hydrogeologic parameters, i.e., sand and gravel lithology that favors source term transport, were used in the simulations. Likewise, the "net infiltration" rate for the area was inputted at +0.001 m/day, even though, in the area it is a negative value, i.e., evaporation exceeds precipitation. Also, Benzene, being the most mobile of the BTEX compounds, i.e., Benzene, Toluene, Ethyl Benzene, Xylenes was inputted as the chemical species at a value equal to the mass sum of the BTEX compounds. This approach also serves to make the simulations more conservative. Below are the outcome charts for the different scenarios using a Benzene source term of 1,246 mg/Kg, the highest VOC headspace concentration, assumed to be BTEX, delineated on site. Model "receptors" for Benzene impact from the remaining contaminated soil column were selected to be the ground water interface and 1, 2, and 3 meters into the ground water.

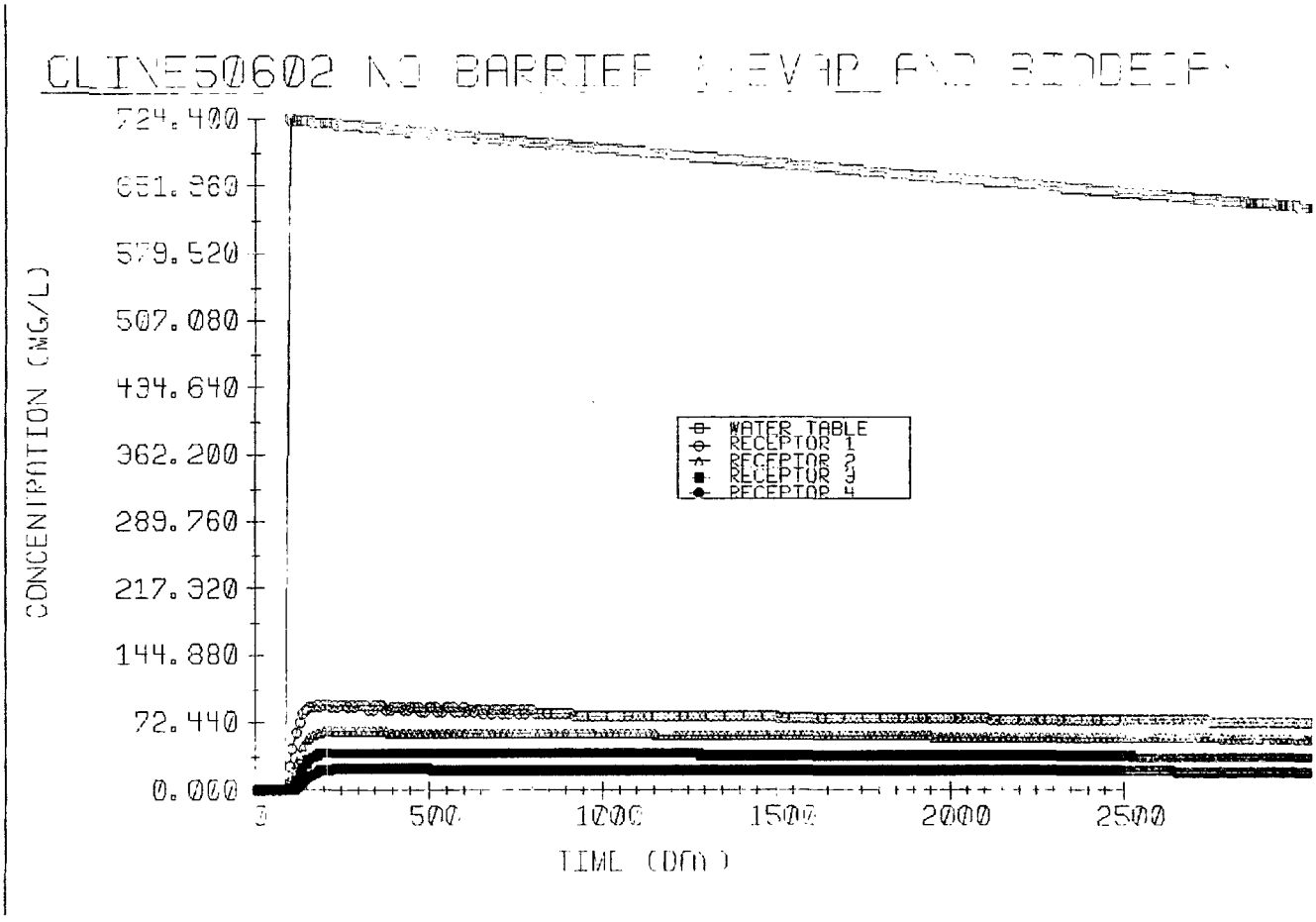
8.4 Simulation I: No Barrier, Evaporation, or Biodecay

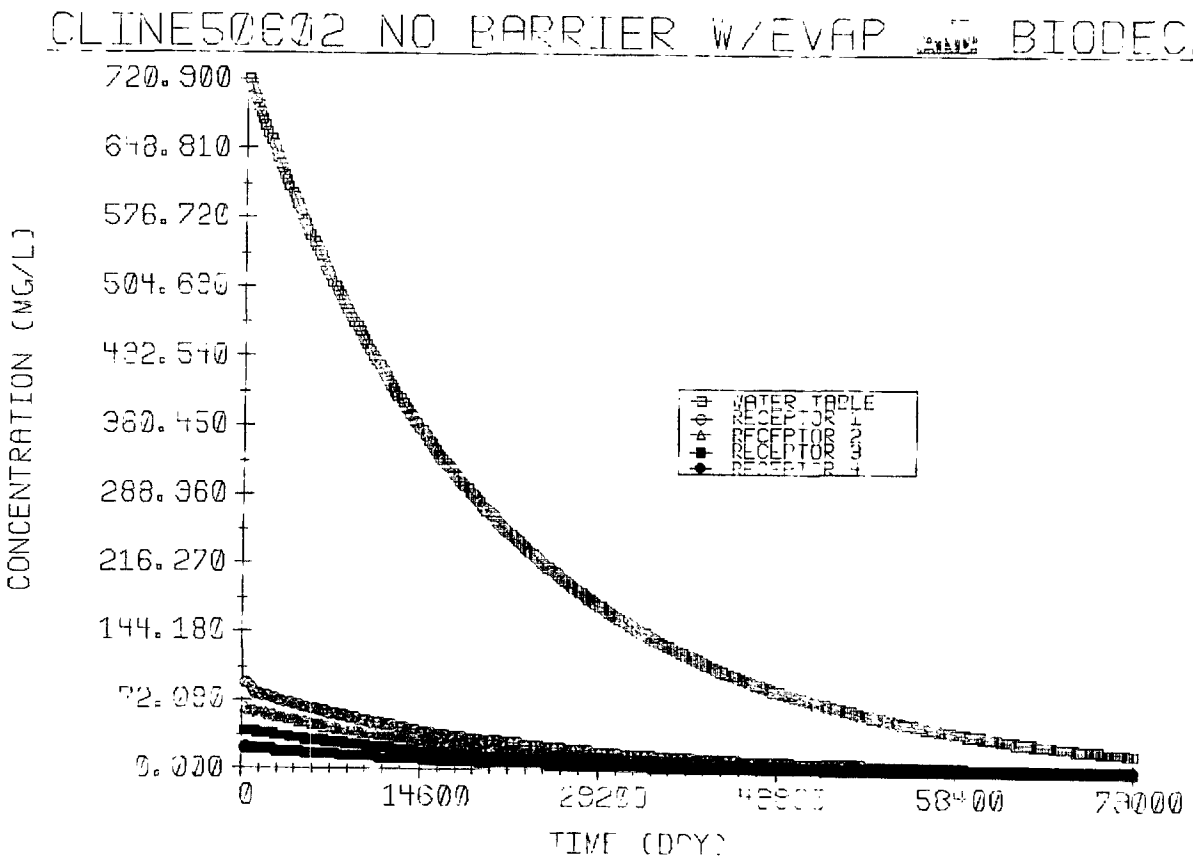
This simulation is provided to show the models' ability to show impact and is the most conservative but unrealistic, not allowing for natural attenuation of the source term through evaporation or biodecay. The charts below illustrate that ground water will be impacted within about 150 days at a maximum level of 722.200 mg/L within approximately 150 days and not disperse to acceptable levels in 200 years. This model illustration also suggests that contamination decreases exponentially from the ground water surface vertically to 3 meters into the saturated zone.



8.5 Simulation II: No Barrier with Evaporation and Biodecay

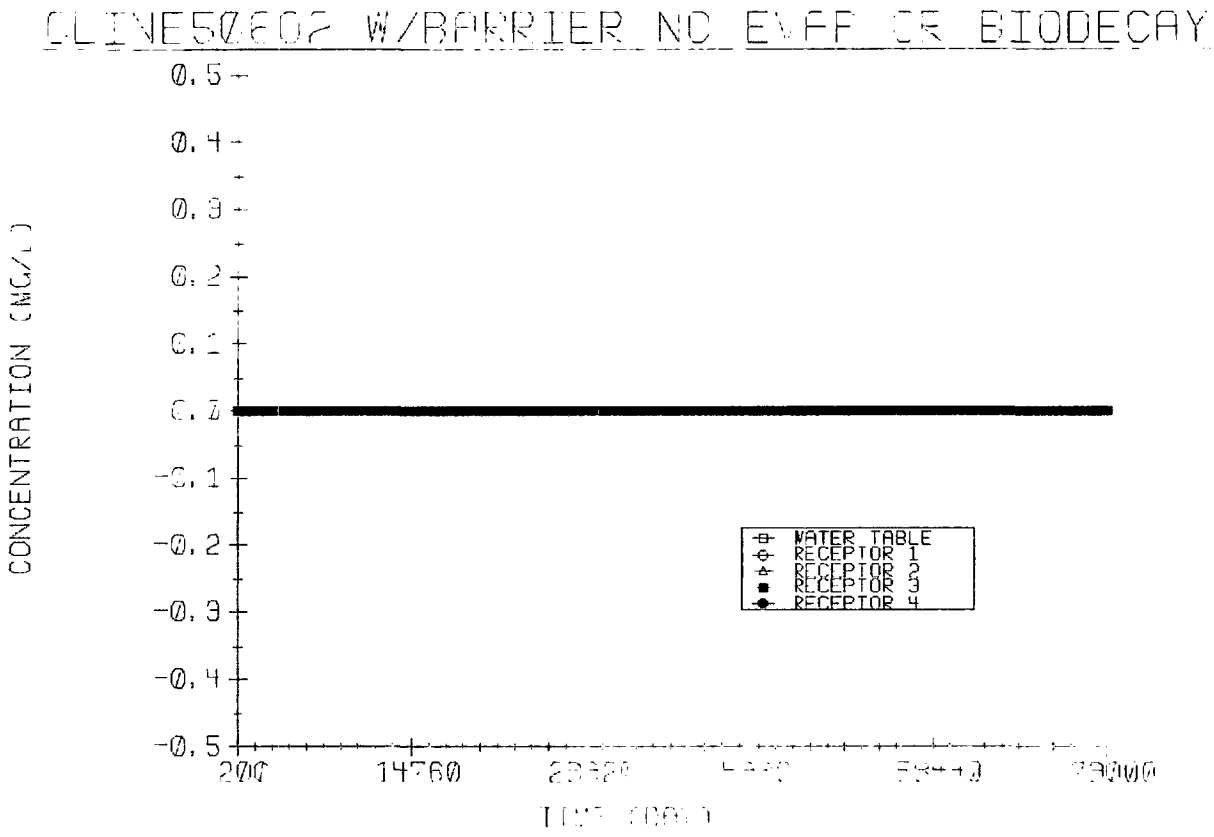
This simulation does not install an engineered barrier but does allow for natural attenuation through evaporation and biodecay of the source term and illustrates the gradual natural attenuation of the source term. The ground water will be impacted by Benzene at 724.400 mg/L in approximately 150 days but will however attenuate to acceptable levels in approximately 200 years. The first illustration is for the first 7 years and the second extends the model output through 200 years. Again, an exponential decrease in Benzene impact is observed at points beneath the surface of the saturated zone.




CLINE50602 NO BARRIER W/EVAP & BIODECAY
720.900
648.810
576.720
504.630
432.540
360.450
288.360
216.270
144.180
72.090
0.000
CONCENTRATION (MG/L)
0
14600
29200
43800
58400
73000
TIME (DAY)
WATER TABLE
RECEPTOR 2
RECEPTOR 3

8.6 Simulation III: With Engineered Clay Barrier with No Evaporation or Biodecay

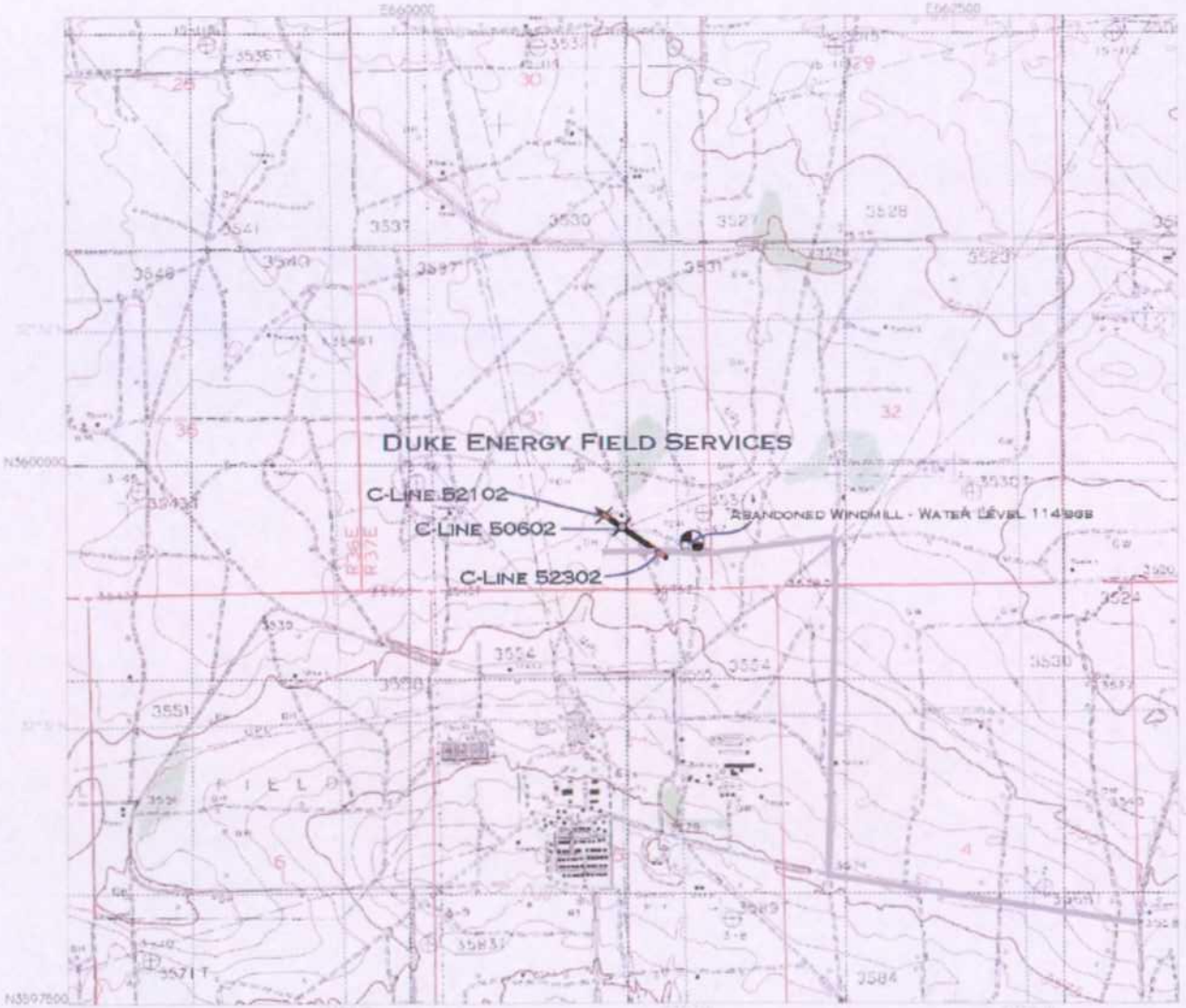
This simulation illustrates that, even with the conservative input parameters and not allowing for natural attenuation through evaporation and biodecay that the barrier will be effective in eliminating the vertical transport mechanism and adequately isolate the remaining source term.



9.0 Conclusion

The computer simulations illustrate that the installation of an engineered barrier will adequately protect ground water from future impacts by permanently interrupting the vertical transport mechanism and serve to isolate the hydrocarbon source term from the environment for a duration sufficient to allow natural attenuation to below acceptable CoC thresholds.

Attachment I: Figures and Maps



DUKE ENERGY
FIELD SERVICES
C-LINE SITES
50602
52102
52302
UL-O&P SEC 31
T20S R37E

N

SCALE 1:30,000

0 5,000

FEET

UNIVERSAL TRANSVERSE MERCATOR
13 NORTH
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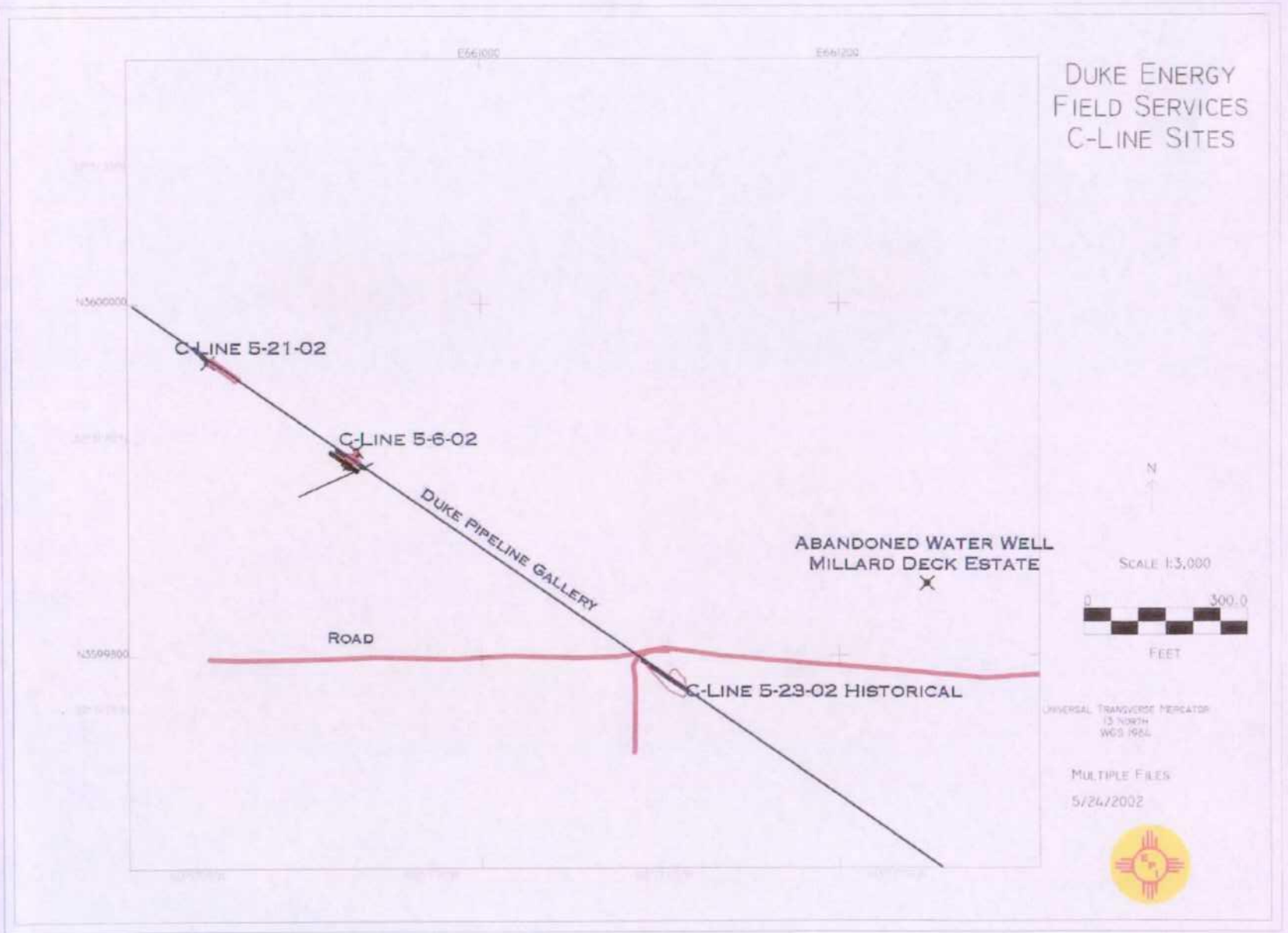
DUKECLINECOMBINEDFIN.SSF

5/30/2002


DUKE ENERGY
FIELD SERVICES
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E661200
N3600000
N3599800
C-LINE 5-21-02
C-LINE 5-6-02
DUKE PIPELINE GALLERY
ABANDONED WATER WELL
MILLARD DECK ESTATE
ROAD
C-LINE 5-23-02 HISTORICAL
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FEET
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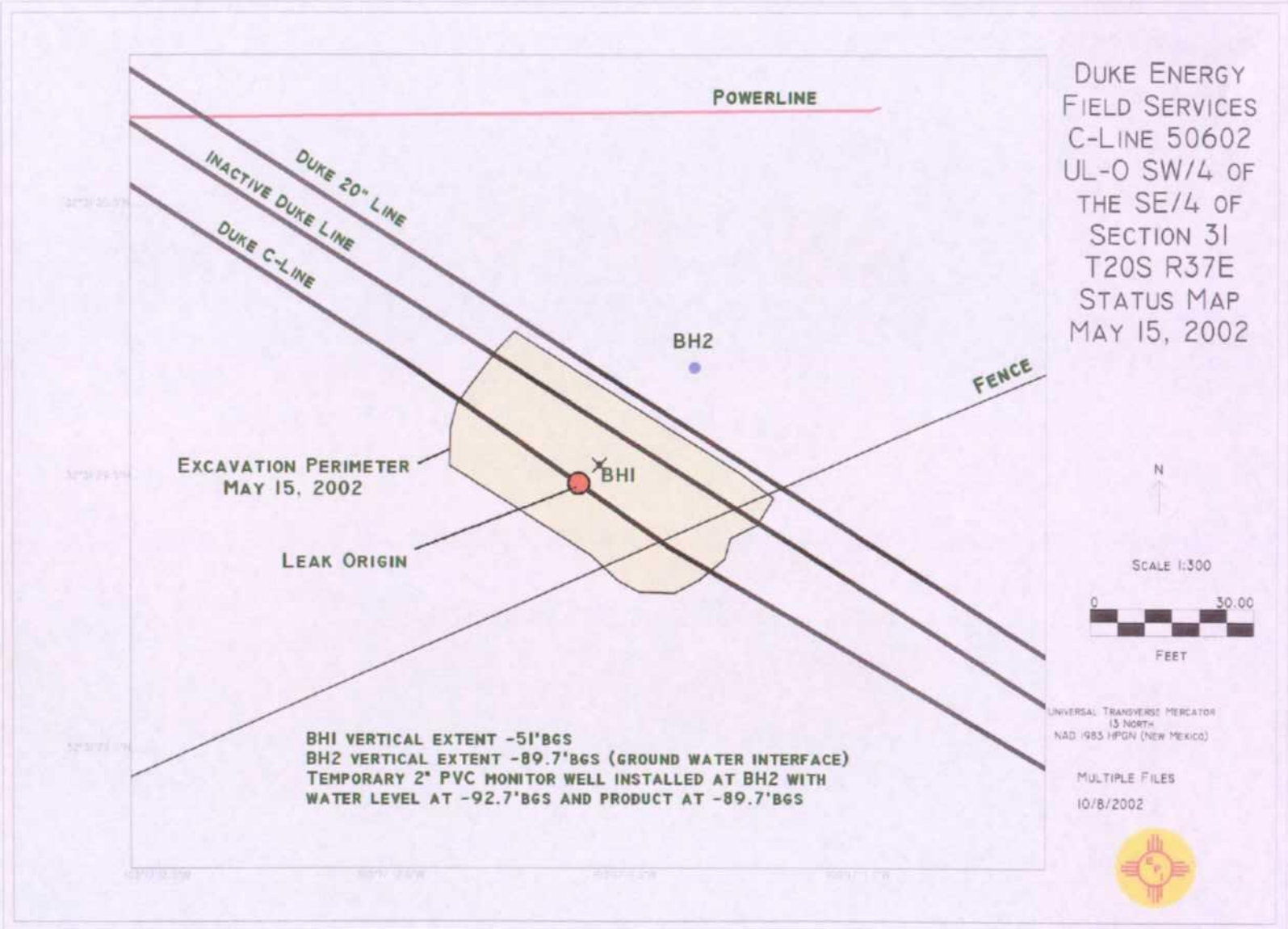
13 NORTH
WGS 1984
MULTIPLE FILES
5/24/2002


POWERLINE
DUKE 20" LINE
INACTIVE DUKE LINE
DUKE C-LINE
BH2
FENCE
EXCAVATION PERIMETER
MAY 15, 2002
BH1
LEAK ORIGIN
BH1 VERTICAL EXTENT -51'BGS
BH2 VERTICAL EXTENT -89.7'BGS (GROUND WATER INTERFACE)
TEMPORARY 2" PVC MONITOR WELL INSTALLED AT BH2 WITH
WATER LEVEL AT -92.7'BGS AND PRODUCT AT -89.7'BGS
DUKE ENERGY
FIELD SERVICES
C-LINE 50602
UL-O SW/4 OF
THE SE/4 OF
SECTION 31
T20S R37E
STATUS MAP
MAY 15, 2002
N
SCALE 1:300
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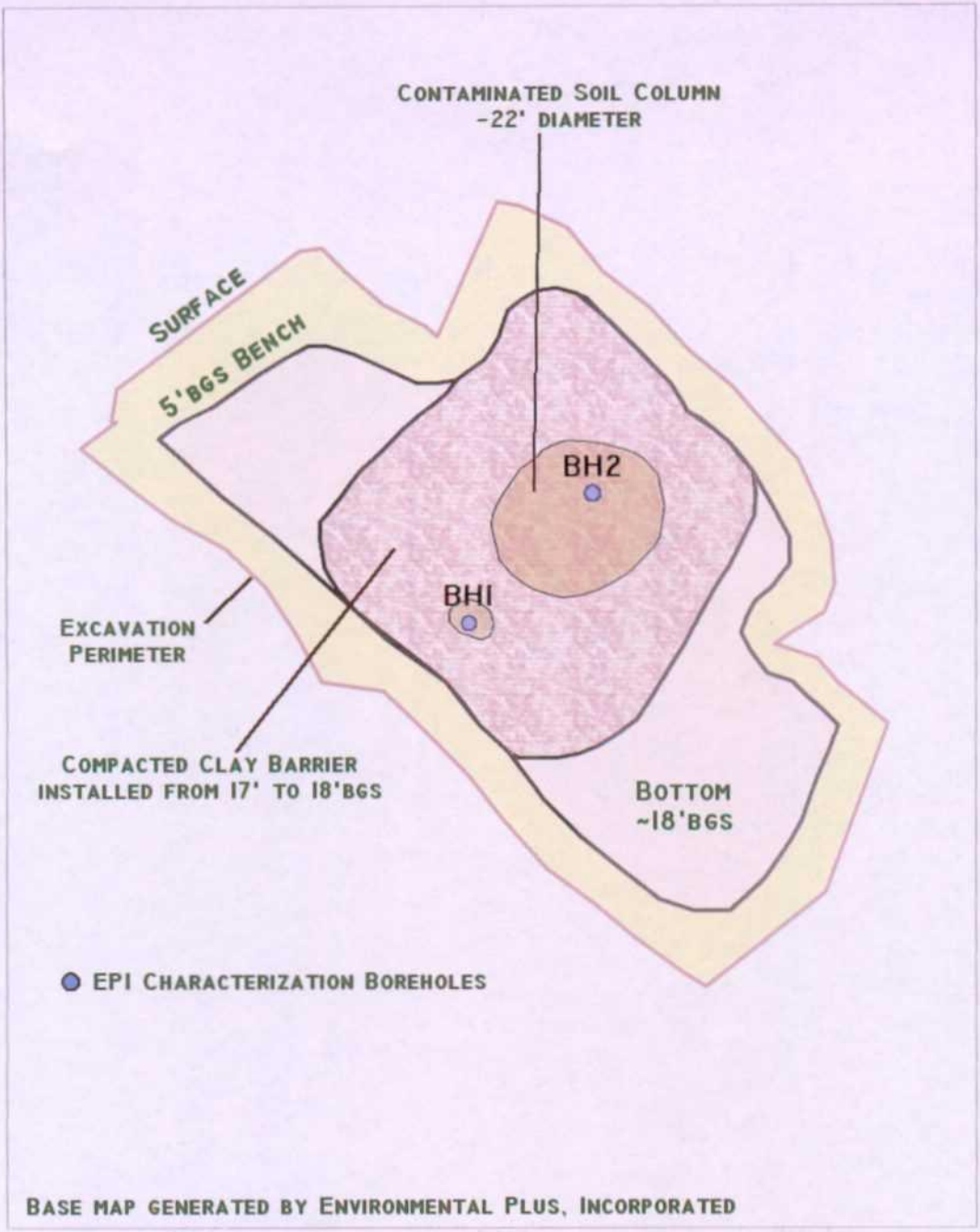
30.00
FEET
UNIVERSAL TRANSVERSE MERCATOR
13 NORTH
NAD 1983 HPGN (NEW MEXICO)
MULTIPLE FILES
10/8/2002



DUKE ENERGY FIELD SERVICES
C-LINE 50602 EXCAVATION/BOREHOLE MAP
SW/4 OF THE SE/4 UL-O SECTION 31 T20S R37E

UNIVERSAL TRANSVERSE MERCATOR
13 NORTH
NAD 1983 HPGN (NEW MEXICO)

N

SCALE 1:300
0 35.00
FEET

MULTIPLE FILES
10/8/2002

Attachment II: Site Photographs


DUKE ENERGY FIELD SERVICES
C-LINE 50602
UL-O SECTION 31 T20 R37E
DUKE C-LINE MAY 8 2002


DUKE ENERGY FIELD SERVICES
C-LINE 50602
UL-O SECTION 31 T20 R37E
MAY 8 2002


DUKE ENERGY FIELD SERVICES
C-LINE 50602
5/15/2002 11:48am


DUKE ENERGY FIELD SERVICES
C-LINE 50602
UL-O SECTION 31 T20S R37E
6/13/2002 11:27am

Attachment III: Site Information and Metrics Form and Initial C-141

Duke Energy Field Services Site Information and Metrics	Incident Date and NMOCD Notified? May 6, 2002 NMOCD notified immediately
SITE: C-Line5602	Assigned Site Reference #:
Company: Duke Energy Field Services	
Street Address: 11525 West Carlsbad Highway	
Mailing Address: 11525 West Carlsbad Highway	
City, State, Zip: Hobbs, NM 88240	
Representative: Paul Mulkey/Stan Shaver/Ronnie Gilchrest	
Representative Telephone: 505.397.5716 / 505.397.5561	
Telephone:	
Fluid volume released (bbls): 70	Recovered (bbls): 50
>25 bbls: Notify NMOCD verbally within 24 hrs and submit form C-141 within 15 days. (Also applies to unauthorized releases >500 mcf Natural Gas)	
5-25 bbls: Submit form C-141 within 15 days (Also applies to unauthorized releases of 50-500 mcf Natural Gas)	
Leak, Spill, or Pit (LSP) Name: C-Line5602	
Source of contamination: Natural Gas Gathering Line	
Land Owner, i.e., BLM, ST, Fee, Other: State of New Mexico leased by M. Deck Estate	
LSP Dimensions ~25' x 11'	
LSP Area: 181 ft²	
Location of Reference Point (RP)	
Location distance and direction from RP	
Latitude: 32° 31' 29.689"N	
Longitude: 103° 17' 11.654"W	
Elevation above mean sea level: 3540'amsl	
Feet from South Section Line	
Feet from West Section Line	
Location- Unit or ¼¼: SW¼ of the SE ¼	Unit Letter: O
Location- Section: 31	
Location- Township: 20S	
Location- Range: 37E	
Surface water body within 1000 ' radius of site: None	
Surface water body within 1000 ' radius of site:	
Domestic water wells within 1000' radius of site: None	
Domestic water wells within 1000' radius of site:	
Agricultural water wells within 1000' radius of site: None	
Agricultural water wells within 1000' radius of site:	
Public water supply wells within 1000' radius of site: None	
Public water supply wells within 1000' radius of site:	
Depth from land surface to ground water (DG) ~68.5'bgs Original Estimate. Measured to be 93'bgs	
Depth of contamination (DC) –	
Depth to ground water (DG – DC = DtGW) - 0.0	

1. Ground Water	2. Wellhead Protection Area	3. Distance to Surface Water Body
If Depth to GW <50 feet: *20 points*	If <1000' from water source, or;<200' from private domestic water source: *20 points*	<200 horizontal feet: *20 points*
If Depth to GW 50 to 99 feet: *10 points*		200-100 horizontal feet: *10 points*
If Depth to GW >100 feet: *0 points*	If >1000' from water source, or, >200' from private domestic water source: *0 points*	>1000 horizontal feet: *0 points*
Ground water Score = 10	*Wellhead Protection Area Score= 0*	*Surface Water Score= 0*
Site Rank (1+2+3) = 10		

Total Site Ranking Score and Acceptable Concentrations

Parameter	>19 (43' to 93'bgs)	10-19 (surface to 43'bgs)	0-9
Benzene[1]	**10 ppm**	**10 ppm**	10 ppm
BTEX[1]	**50 ppm**	**50 ppm**	50 ppm
TPH	**100 ppm**	**1000 ppm**	5000 ppm

[1]100 ppm field VOC headspace measurement may be substituted for lab analysis

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised March 17, 1999

Submit 2 Copies to appropriate District Office in accordance with Rule 116 on back side of form

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company	Contact
Duke Energy Field Services	**Paul Mulkey**
Address	Telephone No.
11525 West Carlsbad Hwy, Hobbs, NM 88240	505.397.5716
Facility Name	Facility Type
C-Line 50602	Natural Gas Pipeline

Surface Owner	Mineral Owner	Lease No.
State of New Mexico		

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County: Lea Lat. 32° 31' 29.689" N Lon. 103° 17' 11.654"W
O	31	20S	37E					

NATURE OF RELEASE

Type of Release	Volume of Release	Volume Recovered
Crude oil and produced water	70 barrels	50 barrels
Source of Release	Date and Hour of Occurrence	Date and Hour of Discovery
20" Steel pipeline	5-6-02 @ 8:00 AM	5-6-02 @ 8:00 AM
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Sylvia Dickie	
By Whom? Paul Mulkey	Date and Hour 5-6-02 10:00AM	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse. NA	

If a Watercourse was Impacted, Describe Fully.*
NA

Describe Cause of Problem and Remedial Action Taken.*
Corroded pipe. Line repair clamps installed.

Describe Area Affected and Cleanup Action Taken.*
Area = 181 ft² (25' x 11') Ground water occurs at ~68.5 feet below ground surface. The site rank is 10 points. Contaminated soil above the site remedial goals will be excavated and disposed. Remedial Goals: TPH 8015m = 1000 mg/Kg, Benzene = 10 mg/Kg, and the sum of Benzene, Ethyl Benzene, Toluene, and Xylenes = 50 mg/Kg.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature: original signed by Paul Mulkey	OIL CONSERVATION DIVISION	
Printed Name: Paul Mulkey	Approved by District Supervisor:	
Title: Maintenance Construction Supervisor	Approval Date:	Expiration Date:
Date: Phone: 505.397.5716	Conditions of Approval:	Attached ☐

* Attach Additional Sheets If Necessary

Attachment IV: Analytical Summary and Reports

Duke Energy Field Services C-Line 50602
Soil Delineation Data Summary

Sample Location	Sampling Interval (FT. BGS[1])	SAMPLE ID#	Sample Date	Lithology	HEADSPACE VOC[2] (ppm)	GRO[3] mg/Kg	DRO[4] mg/Kg	TPH[5] (8015M.) mg/Kg	BTEX mg/Kg	Benzene mg/Kg	Toluene mg/Kg	Ehtyl Benzene mg/Kg	Total Xylenes mg/Kg	Chloride mg/Kg
BH1	26	SDCL51302CBH-26	5/13/2002	FINE RED TO BROWN SAND	108	*10*	*21.2*	*31.2*	*0.030*	*0.005*	*0.005*	*0.005*	*0.015*	96
BH1	31	SDCL51302CBH-31	5/13/2002	FINE BROWN SAND AND STAINED CALICHE	540	na	na	na	na	na	na	na	na	na
BH1	36	SDCL51302CBH-36	5/13/2002	FINE BROWN SAND	870	na	na	na	na	na	na	na	na	na
BH1	41	SDCL51302CBH-41	5/13/2002	FINE BROWN SAND	455	na	na	na	na	na	na	na	na	na
BH1	46	SDCL51302CBH-46	5/13/2002	FINE BROWN SAND	47.4	*10*	*10*	*20*	*0.030*	*0.005*	*0.005*	*0.005*	*0.015*	80
BH1	51	SDCL51302CBH-51	5/13/2002	FINE GRAY SAND	7.9	*10*	*10*	*20*	0.558	0.011	0.160	0.108	0.279	80
BH2	5	SDCL51302EBH-5	5/13/2002	FINE BROWN SAND	1.5	*10*	*10*	*20*	*0.030*	*0.005*	*0.005*	*0.005*	*0.015*	48
BH2	10	SDCL51302EBH-10	5/13/2002	FINE BROWN SAND	230	na	na	na	na	na	na	na	na	na
BH2	15	SDCL51302EBH-15	5/13/2002	FINE BROWN SAND	885	na	na	na	na	na	na	na	na	na
BH2	20	SDCL51302EBH-20	5/13/2002	FINE BROWN SAND	525	na	na	na	na	na	na	na	na	na
BH2	25	SDCL51302EBH-25	5/13/2002	FINE BROWN SAND	715	na	na	na	na	na	na	na	na	na
BH2	30	SDCL51302EBH-30	5/13/2002	FINE BROWN SAND	966	*10*	*10*	*20*	*0.030*	*0.005*	*0.005*	*0.005*	*0.015*	112
BH2	35	SDCL51402EBH-35	5/14/2002	FINE BROWN SAND	954	na	na	na	na	na	na	na	na	na
BH2	40	SDCL51402EBH-40	5/14/2002	FINE BROWN SAND AND STAINED CALICHE	735	na	na	na	na	na	na	na	na	na
BH2	45	SDCL51402EBH-45	5/14/2002	FINE BROWN SAND	1246	na	na	na	na	na	na	na	na	na
BH2	50	SDCL51402EBH-50	5/14/2002	EXTRA FINE TAN SAND	651	*10*	*10*	*20*	*0.030*	*0.005*	*0.005*	*0.005*	*0.015*	48
BH2	55	SDCL51402EBH-55	5/14/2002	EXTRA FINE TAN SAND	866	na	na	na	na	na	na	na	na	na
BH2	60	SDCL51402EBH-60	5/14/2002	EXTRA FINE TAN SAND	1063	na	na	na	na	na	na	na	na	na
BH2	65	SDCL51402EBH-65	5/14/2002	EXTRA FINE TAN SAND	470	na	na	na	na	na	na	na	na	na
BH2	70	SDCL51402EBH-70	5/14/2002	EXTRA FINE TAN SAND	386	na	na	na	na	na	na	na	na	na
BH2	75	SDCL51402EBH-75	5/14/2002	EXTRA FINE TAN SAND	368	na	na	na	na	na	na	na	na	na
BH2	80	SDCL51402EBH-80	5/14/2002	EXTRA FINE TAN SAND	341	na	na	na	na	na	na	na	na	na
BH2	80 PROBE	SDCL51502EBH-80P	5/15/2002	EXTRA FINE GRAY SAND	48.3	*10*	*10*	*20*	0.254	0.008	0.033	0.053	0.160	64
BH2	85	SDCL51502EBH-85	5/15/2002	EXTRA FINE GRAY TO BROWN SAND	735	*10*	*10*	*20*	*0.030*	*0.005*	*0.005*	*0.005*	*0.015*	80
BH2	90	SDCL51502EBH-90	5/15/2002	WET EXTRA FINE BROWN SAND	453	na	na	na	na	na	na	na	na	na
SPOILS PILE	-	SDCL60402SP	6/4/2002	SAND	657	794	103	897	**85.940**	3.540	31.400	13.400	37.600	na
SHREDDED SPOILS	-	SDCL60402SS	6/4/2002	SAND	493	*10*	*10*	*20*	0.485	*0.005*	0.076	0.084	0.320	na
NORTH SIDEWALL	5 POINT COMPOSITE	SDEFS61002NSW	6/10/2002	SAND AND CALICHE	0.4	*10*	*10*	*20*	*0.030*	*0.005*	*0.005*	*0.005*	*0.015*	80
SOUTH SIDEWALL	5 POINT COMPOSITE	SDEFS61002SSW	6/10/2002	SAND AND CALICHE	7.5	*10*	58	*68*	*0.030*	*0.005*	*0.005*	*0.005*	*0.015*	112
EAST SIDEWALL	5 POINT COMPOSITE	SDEFS61002ESW	6/10/2002	SAND AND CALICHE	0.3	*10*	*10*	*20*	*0.030*	*0.005*	*0.005*	*0.005*	*0.015*	96
WEST SIDEWALL	5 POINT COMPOSITE	SDEFS61002WSW	6/10/2002	SAND AND CALICHE	0.2	*10*	*16.9*	*26.9*	*0.030*	*0.005*	*0.005*	*0.005*	*0.015*	96
BOTTOM HOLE	5 POINT COMPOSITE	SDEFS61002BH	6/10/2002	SAND AND CALICHE	7	*10*	*27.3*	*37.3*	*0.030*	*0.005*	*0.005*	*0.005*	*0.015*	96

[1]bgs – below ground surface

[2]VOC–Volatile Organic Contaminants/Constituents

[3]GRO-Gasoline Range Organics (C_6-C_{10})

[4]DRO-Diesel Range Organics (> C_{10}-C_{28})

[5]TPH(8015 Mod.)-Total Petroleum Hydrocarbon = GRO+DRO.

Laboratory analyses were performed by Cardinal Laboratories of Hobbs New Mexico

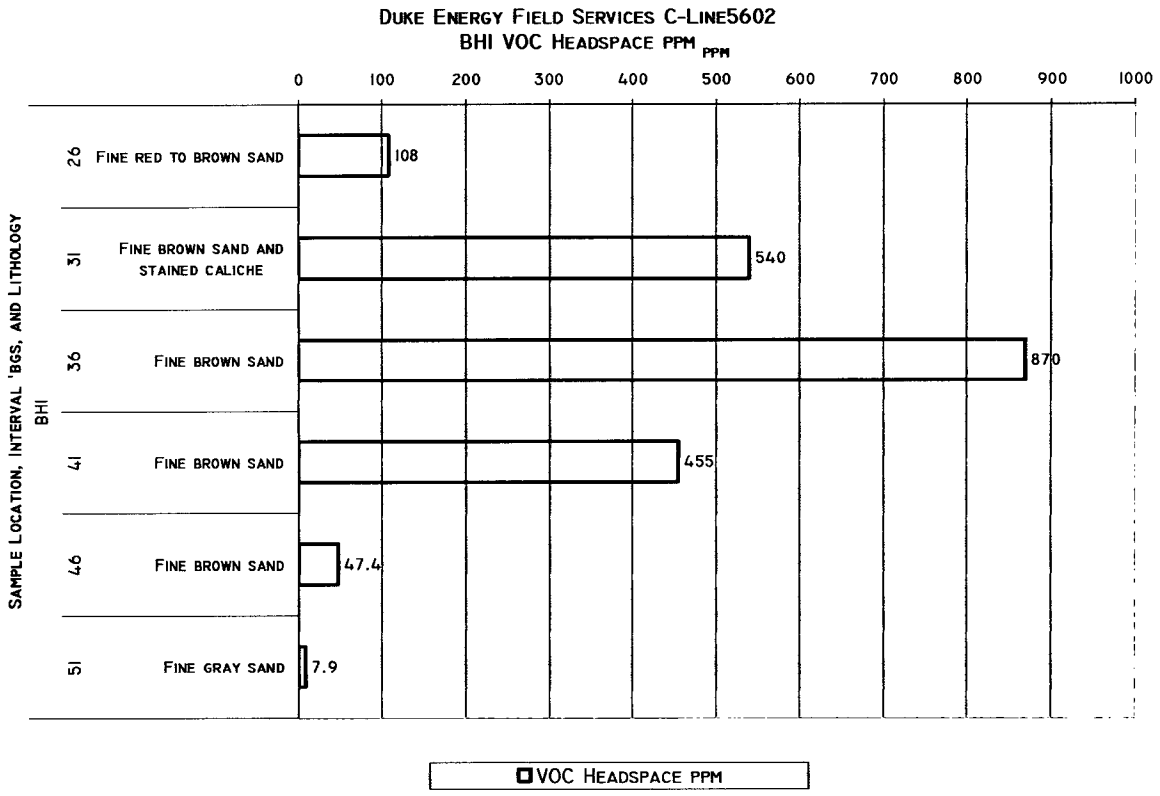
[6]Bolded values are in excess of the New Mexico Oil Conservation Division guideline threshold for the parameter

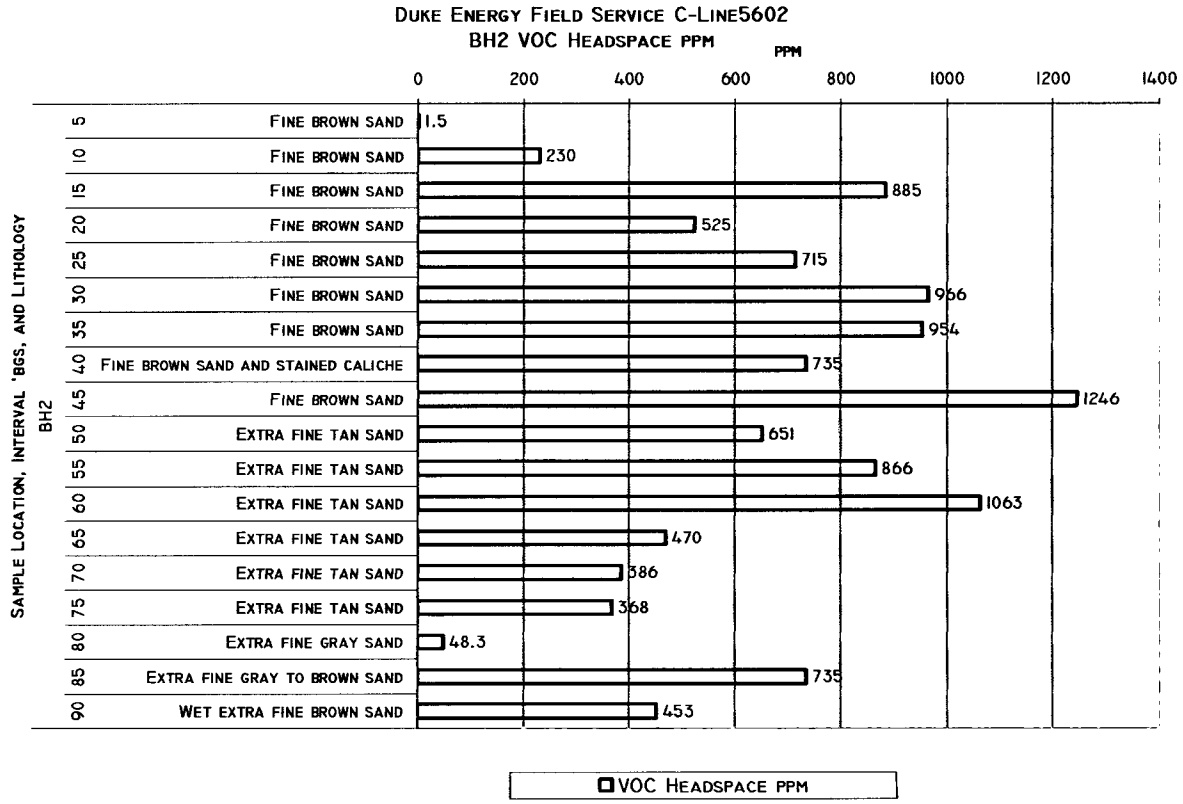
[7]Italicized values are < the instrument detection limit.

[8]na - Not Analyzed

[9]Total Petroleum Hydrocarbon Method 418.1

Reported detection limits are considered "de minimus" values and are included in the GRO/DRO and BTEX summations.


DUKE ENERGY FIELD SERVICES C-LINE5602
BHI VOC HEADSPACE PPM
PPM
0
100
200
300
400
500
600
700
800
900
1000
SAMPLE LOCATION, INTERVAL 'BGS, AND LITHOLOGY
BHI
26
FINE RED TO BROWN SAND
108
31
FINE BROWN SAND AND STAINED CALICHE
540
36
FINE BROWN SAND
870
41
FINE BROWN SAND
455
46
FINE BROWN SAND
47.4
51
FINE GRAY SAND
7.9
VOC HEADSPACE PPM


DUKE ENERGY FIELD SERVICE C-LINE5602
BH2 VOC HEADSPACE PPM
PPM
0
200
400
600
800
1000
1200
1400
SAMPLE LOCATION, INTERVAL 'BGS, AND LITHOLOGY
BH2
5
FINE BROWN SAND
1.5
10
FINE BROWN SAND
230
15
FINE BROWN SAND
885
20
FINE BROWN SAND
525
25
FINE BROWN SAND
715
30
FINE BROWN SAND
966
35
FINE BROWN SAND
954
40
FINE BROWN SAND AND STAINED CALICHE
735
45
FINE BROWN SAND
1246
50
EXTRA FINE TAN SAND
651
55
EXTRA FINE TAN SAND
866
60
EXTRA FINE TAN SAND
1063
65
EXTRA FINE TAN SAND
470
70
EXTRA FINE TAN SAND
386
75
EXTRA FINE TAN SAND
368
80
EXTRA FINE GRAY SAND
48.3
85
EXTRA FINE GRAY TO BROWN SAND
735
90
WET EXTRA FINE BROWN SAND
453
VOC HEADSPACE PPM

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
ENVIRONMENTAL PLUS, INC.
ATTN: PAT McCASLAND
P.O. BOX 1558
EUNICE, NM 88231
FAX TO: (505) 394-2601

Receiving Date: 05/17/02
Reporting Date: 05/21/02
Project Number: 5602 (DUKE)
Project Name: C-LINE 5602
Project Location: UL-0 SEC31 T20S R37E

Sampling Date: 05/13 through 05/15/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NUMBER	SAMPLE ID	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE		05/17/02	05/17/02	05/17/02	05/17/02
H6745-1	SDCL51302CBH-26	<0.005	<0.005	<0.005	<0.015
H6745-2	SDCL51302CBH-46	<0.005	<0.005	<0.005	<0.015
H6745-3	SDCL51302CBH-51	0.011	0.160	0.108	0.279
H6745-4	SDCL51302EBH-5	<0.005	<0.005	<0.005	<0.015
H6745-5	SDCL51302EBH-30	<0.005	<0.005	<0.005	<0.015
H6745-6	SDCL51402EBH-50	<0.005	<0.005	<0.005	<0.015
H6745-7	SDCL51502EBH-80P	0.008	0.033	0.053	0.160
H6745-8	SDCL51502EBH-85	<0.005	<0.005	<0.005	0.045
Quality Control		0.106	0.106	0.108	0.312
True Value QC		0.100	0.100	0.100	0.300
% Recovery		106	106	108	104
Relative Percent Difference		1.6	0.4	1.2	0.9

METHOD: EPA SW-846 8260

Chemist

5/21/02
Date

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS. NM 88240

ANALYTICAL RESULTS FOR
ENVIRONMENTAL PLUS, INC.
ATTN: PAT McCASLAND
P.O. BOX 1558
EUNICE, NM 88231
FAX TO: (505) 394-2601

Receiving Date: 05/17/02
Reanalysis Reporting Date: 05/28/02
Project Number: 5602 (DUKE)
Project Name: C-LINE 5602
Project Location: UL-0 SEC31 T20S R37E

Sampling Date: 05/13 through 05/15/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC/AH

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/Kg)	DRO (>C_{10}-C_{28}) (mg/Kg)
ANALYSIS DATE:		05/21/02	05/21/02
H6745-1	SDCL51302CBH-26	<20.0	<20.0
H6745-2	SDCL51302CBH-46	<20.0	<20.0
H6745-3	SDCL51302CBH-51	<20.0	<20.0
H6745-4	SDCL51302EBH-5	<20.0	<20.0
H6745-5	SDCL51302EBH-30	<20.0	<20.0
H6745-6	SDCL51402EBH-50	<20.0	<20.0
H6745-7	SDCL51502EBH-80P	<20.0	<20.0
H6745-8	SDCL51502EBH-85	<20.0	<20.0
Quality Control		818	798
True Value QC		800	800
% Recovery		102	99.8
Relative Percent Difference		5.5	2.6

METHOD: SW-846 8015 M

Chemist

5/28/02
Date

H6745TR.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
ENVIRONMENTAL PLUS, INC.
ATTN: PAT McCASLAND
P.O. BOX 1558
EUNICE, NM 88231
FAX TO: (505) 394-2601

Receiving Date: 05/17/02
Reporting Date: 05/20/02
Project Number: 5602 (DUKE)
Project Name: C-LINE 5602
Project Location: UL-0 SEC31 T20S R37E

Sampling Date: 05/13 through 05/15/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC/AH

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/Kg)	DRO (>C_{10}-C_{28}) (mg/Kg)	Cl* (mg/Kg)
ANALYSIS DATE		05/17/02	05/17/02	05/20/02
H6745-1	SDCL51302CBH-26	<10.0	21.2	96
H6745-2	SDCL51302CBH-46	<10.0	<10.0	80
H6745-3	SDCL51302CBH-51	<10.0	<10.0	80
H6745-4	SDCL51302EBH-5	<10.0	<10.0	48
H6745-5	SDCL51302EBH-30	<10.0	<10.0	112
H6745-6	SDCL51402EBH-50	<10.0	<10.0	48
H6745-7	SDCL51502EBH-80P	<10.0	<10.0	64
H6745-8	SDCL51502EBH-85	<10.0	<10.0	80
Quality Control		818	798	1040
True Value QC		800	800	1000
% Recovery		102	99.8	104
Relative Percent Difference		5.5	2.6	4.0

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; Cl^-: Std. Methods 4500-Cl^-B
*Analyses performed on 1:4 w:v aqueous extracts.

Burgess A. Cooke
Chemist

5/20/02
Date

H6745A.XLS

CARDINAL LABORATORIES, INC.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

211 E. Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

Page 1 of 1

Company Name: EPF	**BILL TO**
Project Manager: Pat McCasland	P.O. #:
Address: PO Box 1558	Company:
City: Eunice State: NM Zip: 88231	Attn:
Phone #: 505.394.2648 Fax #: 505.394.2601	Address:
Project #: 5602 Project Owner: Duke	City:
Project Name: C-Line 5602	State: Zip:
Project Location: UL-O Sec 31 T20S R37E	Phone #:
Sampler Name: Bradley Blevins	Fax #:

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST										
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	TPH (8015M)	BTEX (8020/8260)	Chloride								
H6743-1	SDCL51302CBH-26	C	1			✓					✓		5.13.02	0910	✓	✓	✓								
-2	SDCL51302CBH-41	C	1			✓					✓		5.13.02	1124	✓	✓									
-3	SDCL51302CBH-51	C	1			✓					✓		5.13.02	1210	✓	✓	✓								
-4	SDCL51302EBH-5	C	1			✓					✓		5.13.02	1340	✓	✓	✓								
-5	SDCL51302EBH-30	C	1			✓					✓		5.13.02	1455	✓	✓									
-6	SDCL51302EBH-50	C	1			✓					✓		5.14.02	0840	✓	✓	✓								
-7	SDCL51502EBH-80P	C	1			✓					✓		5.15.02	0820	✓	✓									
-8	SDCL51502EBH-85	C	1			✓					✓		5.15.02	0900	✓	✓	✓								

Sampler Relinquished: Bradley Blevins	Date:	Received By:	Phone Result: ☐ Yes ☐ No	Add'l Phone #:	
	Time:		Fax Result: ☑ Yes ☐ No	Add'l Fax #:	
Relinquished By:	Date: 5/17/02	Received By: (Lab Staff) Jennifer K. Cook	REMARKS: FAX CoC request		
	Time:				
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition Cool: ☑ Yes ☐ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials)		

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88 (505) 393-2326 Fax (505) 393-2476

Page ____ of ____

Company Name: DUKE ENERGY
Project Manager: PAUL MULKEY
Address:
State: Zip:
Phone #: Fax #:
Project #: Project Owner:
Project Name: Duke C-Line
Project Location:
Sampler Name: Bradley Blevins

BILL TO
P.O. #: CPI
Company:
Attn:
Address:
City:
State: Zip:
Phone #:
Fax #:

ANALYSIS REQUEST

Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER:	PRESERV: ACID/BASE:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	TPH 8015m	Btex 8021b	CL										
	SDCL51302CBH 26'	G	1			X					X		5-13-02	9:10	X	X	+										
	SDCL51302CBH 31'	G	1			X					X		5-13-02	9:50	X	X	+										
	SDCL51302CBH 36'	G	1			X					X		5-13-02	10:40	X	X	+										
	SDCL51302CBH 41'	G	1			X					X		5-13-02	11:00	X	X	+										
	SDCL51302CBH 46'	G	1			X					X		5-13-02	11:24	X	X	+										
	SDCL51302CBH-51'	G	1			X					X		5-13-02	12:10	X	X	+										
	SDCL51302EBH-5'	G	1			X					X		5-13-02	1:40	X	X	+										
	SDCL51302EBH 10'	G	1			X					X		5-13-02	1:55	X	X	+										
	SDCL51302EBH 15'	G	1			X					X		5-13-02	2:05	X	X	+										
	SDCL51302EBH 20'	G	1			X					X		5-13-02	2:15	X	X	+										

Sampler Relinquished: Bradley Blevins
Date: 5-14-02
Time: 4:30
Received By: Roger Boone

Relinquished By:
Date:
Time:
Received By: (Lab Staff)

Delivered By: (Circle One)
Sampler - UPS - Bus - Other:

Sample Condition: Cool: ☐ Yes ☐ No; Intact: ☐ Yes ☐ No
CHECKED BY: (Initials)

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS:

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

RD[redacted]L L[redacted]OR[redacted]OR[redacted], IN[redacted]

211 [illegible]wood, Abilene, TX 79603 (915) 6[illegible]7001 Fax (915) 673-7020

101 East Marland, Hobbs, NM 8[illegible] (505) 393-2326 Fax (505) 393-2476

Page____ of ____

[Com]pany Name: Duke Energy	**BILL TO**
[Proje]ct Manager: Paul Mulkey	P.O. #:
[Addr]ess:	Company: EPI
[City:] State: Zip:	Attn:
[Phon]e #: Fax #:	Address:
[Proje]ct #: Project Owner:	City:
[Proje]ct Name: Duke C-Line	State: Zip:
[Proje]ct Location:	Phone #:
[Sam]pler Name: Bradley Blevins	Fax #:

ANALYSIS REQUEST

Lab I.D. (LAB USE ONLY)	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER:	PRESERV: ACID/BASE:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	TPH 8015m	BTEX 8021b	CL
	SDCL51302EBH 25'	G	1			X					X		5-13-02	2:40	X	X	X
	SDCL51302EBH 30'	G	1			X					X		5-13-02	2:55	X	X	X

[illegible]

[illegible]

Sampler Relinquished: Bradley Blevins	Date: 5-14-02 Time: 4:30	Received By: Roger Boone
Relinquished By:	Date: Time:	Received By: (Lab Staff)

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS:

Delivered By: (Circle One)
Sampler - UPS - Bus - Other:

Sample Condition: Cool ☐ Yes ☐ No; Intact ☐ Yes ☐ No

CHECKED BY: (Initials)

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

[redacted]RD[redacted]L L[redacted]OR[redacted]OR[redacted], IN[redacted]

211[illegible]echwood, Abilene, TX 79603 (915) [illegible]7001 Fax (915) 673-7020

101 East Marland, Hobbs, NM 8[illegible] (505) 393-2326 Fax (505) 393-2476

Page_____ of _____

[illegible]any Name:
[illegible]ct Manager:
[illegible]ss:
State: Zip:
[illegible]e #: Fax #:
[illegible]ct #: Project Owner: Duke
[illegible]ct Name: Duke C-Line
[illegible]ct Location:
[illegible]pler Name: Bradley Bl[illegible]

BILL TO
P.O. #:
Company:
Attn:
Address:
City:
State: Zip:
Phone #:
Fax #:

ANALYSIS REQUEST

Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER :	PRESERV: ACID/BASE:	ICE / COOL	OTHER :	SAMPLING: DATE	TIME	TPH 8015m	BTEX 8021B	CL
	SDCL51402EBH 35'	G	1			X					X		5-14-02	7:15	X	X	X
	SDCL51402EBH 40'	G	1			X					X		5-14-02	7:50	X	X	X
	SDCL51402EBH 45'	G	1			X					X		5-14-02	8:15	X	X	X
	SDCL51402EBH 50'	G	1			X					X		5-14-02	8:40	X	X	X
	SDCL51402EBH 55'	G	1			X					X		5-14-02	9:40	X	X	X
	SDCL51402EBH 60'	G	1			X					X		5-14-02	10:15	X	X	X
	SDCL51402EBH 65'	G	1			X					X		5-14-02	10:30	X	X	X
	SDCL51402EBH 70'	G	1			X					X		5-14-02	10:45	X	X	X
	SDCL51402EBH 75'	G	1			X					X		5-14-02	12:20	X	X	X
	SDCL51402EBH 80'	G	1			X					X		5-14-02	1:00	X	X	X

[illegible]

Sampler Relinquished: Bradley Bl[illegible] | Date: 5-14-02 | Time: 7:30 | Received By: Roger Boone

Relinquished By: | Date: | Time: | Received By: (Lab Staff)

Delivered By: (Circle One)
Sampler - UPS - Bus - Other:

Sample Condition: Cool ☐ Yes ☐ No; Intact ☐ Yes ☐ No

CHECKED BY: (Initials)

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS:

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

[redacted] IN[redacted]

2111 B[redacted]wood, Abilene, TX 79603 (915) [redacted]001 Fax (915) 673-7020

101 East Marland, Hobbs, NM 8824[redacted] (505) 393-2326 Fax (505) 393-2476

Page ____ of ____

any Name:

t Manager:

ss:

State: Zip:

e #: Fax #:

ct #: Project Owner: Duke

ct Name: Duke C-Line

ct Location:

pler Name: Bradley Blevins

BILL TO

P.O. #:

Company:

Attn:

Address:

City:

State: Zip:

Phone #:

Fax #:

ANALYSIS REQUEST

ab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER:	PRESERV: ACID/BASE:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	TPH 8015m	Btex 8021B
	SDCL515022EBH-80'	G	1			X					X		5-15-02	8:20	X	X
	SDCL515022EBH-85'	G	1			X					X		5-15-02	9:00	X	X
	SDCL515022EBH-90'	G	1			X					X		5-15-02	9:40	X	X

[redacted] WITH: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the [redacted]. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable [redacted]. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, [redacted] or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

pler Relinquished:	Date:	Received By:	
	Time:		
linquished By:	Date:	Received By: (Lab Staff)	
	Time:		

Phone Result: ☐ Yes ☐ No Add'l Phone #:

Fax Result: ☐ Yes ☐ No Add'l Fax #:

REMARKS:

elivered By: (Circle One)

mpler - UPS - Bus - Other:

Sample Condition		CHECKED BY:
Cool	Intact	(Initials)
☐ Yes ☐ No	☐ Yes ☐ No	

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS. NM 88240

ANALYTICAL RESULTS FOR
ENVIRONMENTAL PLUS, INC.
ATTN: PAT McCASLAND
P.O. BOX 1558
EUNICE, NM 88231
FAX TO: (505) 394-2601

Receiving Date: 06/04/02
Reporting Date: 06/05/02
Project Owner: DUKE ENERGY
Project Name: C-LINE 50602
Project Location: NOT GIVEN

Sampling Date: 06/04/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/Kg)	DRO (>C_{10}-C_{28}) (mg/Kg)	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE:		06/04/02	06/04/02	06/04/02	06/04/02	06/04/02	06/04/02
H6777-1	SDCL60402SP	794	103	3.54	31.4	13.4	37.6
H6777-2	SDCL60402SS	<10.0	<10.0	0.005	0.076	0.084	0.320
Quality Control		806	818	0.110	0.107	0.108	0.310
True Value QC		800	800	0.100	0.100	0.100	0.300
% Recovery		101	102	110	107	108	103
Relative Percent Difference		7.8	3.0	3.8	2.6	1.7	1.9

METHODS: TPH GRO & DRO - EPA SW-846 8015 M; BTEX - SW-846 8260.

Burgess J. A. Cooke. Ph. D.

6/5/02
Date

H6777.XLS

211[redacted]ech[redacted]d, [redacted]ene[redacted] 79[redacted] 915-673-7001 ax 915-673-7020

[redacted]East[redacted]arla[redacted], Hob[redacted], NM [redacted]0 505-393-2326 : 505-393-2476

Company Name	DUKE ENERGY
Project Manager	PAUL MULKEY
Address	
City, State, Zip	
Phone#/Fax#	
Project #/Owner	
Project Name	C-line
Project Location	
Sampler Name	Bill Trull

Bill To

Analysis Request

LAB I.D.	SAMPLE I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUND WATER	MATRIX: WASTEWATER	MATRIX: SOIL	MATRIX: CUDE OIL	MATRIX: SLUDGE	MATRIX: OTHER:	PRESERV.: ACID/BASE	PRESERV.: ICE/COOL	PRESERV.: OTHER	SAMPLING: DATE	SAMPLING: TIME	BTEX 8021B	TPH 8015M
H6777-1	SDCL60402SP	G	1			X					X		6-4	2:30	X	X
-2	SDCL60402 SS	G	1			X					X		6-4	2:35	X	X

Sampler Relinquished: Bill Trull — Date: 6-4-02 Time: 8:00 — Received By: Brad Hobbs

Relinquished by: Brad Hobbs — Date: 6/4/02 Time: 9:30AM — Received By: (lab staff) [illegible]

Delivered by Sampler

Sample Cool & Intact: (Yes) No

Checked By:

Fax Results To Pat McCasland 505-394-2601

REMARKS:

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
ENVIRONMENTAL PLUS, INC.
ATTN: PAT McCASLAND
P.O. 1558
EUNICE, NM 88231
FAX TO: (505) 394-2601

Receiving Date: 06/11/02
Reporting Date: 06/12/02
Project Owner: DUKE (PAUL MULKEY)
Project Name: C-LINE 50602
Project Location: NOT GIVEN

Sampling Date: 06/10/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC/AH

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/Kg)	DRO (>C_{10}-C_{28}) (mg/Kg)	Cl* (mg/Kg)
ANALYSIS DATE		06/11/02	06/11/02	06/11/02
H6796-1	SDEFS61002NSW	<10.0	<10.0	80
H6796-2	SDEFS61002SSW	<10.0	58.0	112
H6796-3	SDEFS61002ESW	<10.0	<10.0	96
H6796-4	SDEFS61002WSW	<10.0	16.9	96
H6796-5	SDEFS61002BH	<10.0	27.3	96
Quality Control		741	765	980
True Value QC		800	800	1000
% Recovery		92.6	95.6	98.0
Relative Percent Difference		7.2	3.0	6.0

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; Cl^-: Std. Methods 4500-Cl^-B
*Analyses performed on 1:4 w:v aqueous extracts.

Chemist

6/12/02
Date

Yses.
H6796A.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
ENVIRONMENTAL PLUS, INC.
ATTN: PAT McCASLAND
P.O. 1558
EUNICE, NM 88231
FAX TO: (505) 394-2601

Receiving Date: 06/11/02
Reporting Date: 06/12/02
Project Owner: DUKE (PAUL MULKEY)
Project Name: C-LINE
Project Location: NOT GIVEN

Sampling Date: 06/10/02
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

LAB NUMBER	SAMPLE ID	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS DATE		06/11/02	06/11/02	06/11/02	06/11/02
H6796-1	SDEFS61002NSW	<0.005	<0.005	<0.005	<0.015
H6796-2	SDEFS61002SSW	<0.005	<0.005	<0.005	<0.015
H6796-3	SDEFS61002ESW	<0.005	<0.005	<0.005	<0.015
H6796-4	SDEFS61002WSW	<0.005	<0.005	<0.005	<0.015
H6796-5	SDEFS61002BH	<0.005	<0.005	<0.005	<0.015
Quality Control		0.097	0.101	0.105	0.301
True Value QC		0.100	0.100	0.100	0.300
% Recovery		97.4	101	105	100
Relative Percent Difference		1.4	7.3	8.5	5.8

METHOD: EPA SW-846 8260

Chemist

6/12/02
Date

Cardinal Laboratories Inc.

2111 Beechwood, Abilene, TX 79603
915-673-7001 Fax 915-673-7020

101 East Marland, Hobbs, NM 88240
505-393-2326 Fax 505-393-2476

Company Name	DUKE
Project Manager	PAUL MULLEY
Address	
City, State, Zip	
Phone#/Fax#	
Project #/Owner	
Project Name	C-LINE
Project Location	
Sampler Name	Bill Trull

Bill To: EPI

Analysis Request

LAB I.D.	SAMPLE I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUND WATER	WASTEWATER	SOIL	CUDE OIL	SLUDGE	OTHER:	PRESERV.: ACID/BASE	ICE/COOL	OTHER	SAMPLING: DATE	TIME	BTEX 8021B	TPH 8015M	CL
460796-1	SDEFS61002NSW	C	1			X					X		6-10	3:00	X	X	X
-2	SDEFS61002SSW	C	1			X					X		6-10	3:05	X	X	X
-3	SDEFS61002ESW	C	1			X					X		6-10	3:10	X	X	X
-4	SDEFS61002WSW	C	1			X					X		6-10	3:15	X	X	X
-5	SDEFS61002BH	C	1			X					X		6-10	3:20	X	X	X

Sampler Relinquished: Bill Trull	Date 6-10 Time 4:15	Received By: Mata Cox	Fax Results To Pat McCasland 505-394-2601
Relinquished by: Mata Cox	Date 6-11 Time 10:05	Received By: (lab staff) Amy Hill	REMARKS:
Delivered by Sampler	Sample Cool & Intact Yes No	Checked By:	

Attachment V: Risk/Exposure Assessment Input Data

VADSAT Version 3.0
A Monte Carlo Model for Assessing the Effects of Soil Contamination on Groundwater Quality
Developed by:
Environmental Systems and Technologies Inc.
Blacksburg, Virginia
Tel: 703-552-0685, Fax: 703-951-5307
For
The American Petroleum Institute
1995

PROJECT TITLE: Duke CLine50602

SOURCE AND CHEMICAL DATA ****

FKSWM, MEAN WASTE ZONE SAT. CONDUC. (m/day)	=	0.00000
SDFKSW, STD.DEV. OF WASTE ZONE SAT. CONDUC.	=	0.00000
DEPTHM, MEAN THICKNESS OF WASTE ZONE (m)	=	21.00000
DEPSTD, STD.DEV. OF THICKNESS OF WASTE ZONE	=	0.00000
AREAM, MEAN WASTE ZONE AREA (m^2)	=	29.17200
STDA, STD.DEV. OF WASTE ZONE AREA	=	0.00000
RLWM, MEAN L/W RATIO (-)	=	1.00000
STDRLW, STD.DEV. OF L/W RATIO	=	0.00000
CVRTHM, MEAN VALUE OF COVER THICKNESS (m)	=	3.00000
CVRTHS, STD.DEV. OF COVER THICKNESS	=	0.00000
KOCM, MEAN ORG. CARBON PARTITION COEF (cm^3/g)	=	83.20000
STDKOC, STD.DEV. OF ORG.CARBON PARTITION COEF	=	0.00000
FMOLM, MEAN INIT.VOL.FRAC. OF CONTAMINANT(-)	=	0.31624
FMOLSTD, STD.DEV. OF VOL.FRAC. OF CONTAMINANT	=	0.00000
CMFM, MASS OF CONTAMINANT PER MASS OF WASTE(mg/kg)	=	1246.00000
CMFSD, STD.DEV. OF MASS CONTAMINANT PER MASS WASTE	=	0.00000
HCCONM, HYDCARBON MASS FRAC. IN WASTE (mg/kg)	=	3940.00000
HCCONS, STD OF HYDCARBON MASS FRAC. IN WASTE	=	0.00000

CHEMICAL SPECIES	benzene
MOLW, MOLECULAR WT. OF CONTAMINANT (g/mole) =	78.10000
AVERMW, AVG. MOL. WT. OF OILY WASTE (g/mole) =	100.00000
RHO, DENSITY OF CONTAMINANT (g/cm^3) =	0.87600
RHOG, AVERAGE DENSITY OF HYDROCARBON (g/cm^3) =	0.90000
SOL, AQUEOUS SOLUB. OF CONTAMINANT (g/m^3) =	1790.00000

```
      HENRYC, HENRY'S CONSTANT (-)                  =      0.23000

      DIFFA, DIFFUSION COEF. IN FREE AIR (m^2/day) =      0.77000

      HYDROGEOLOGICAL PROPERTIES
      --------------------------

      ** UNSATURATED ZONE INPUT PARAMETERS **
      GAMMAM, MEAN UNSAT ZONE DECAY COEF (1/day)  =      0.00001
      STDGAM, STD.DEV. OF UNSAT ZONE DECAY COEF   =      0.00000

      UNFOCM, MEAN UNSAT ZONE ORGANIC CARBON FRACTION (-) =      0.00650
      UNFOCS, STD.DEV. OF UNSAT ZONE ORGANIC CARBON FRAC. =      0.00000

      FKSW, MEAN SAT. CONDUCTIVITY (m/day)        =      7.12800
      STDFKS, STD.DEV. OF SAT. CONDUCTIVITY       =        0.000

      DISTM, MEAN DEPTH TO GROUNDWATER (m)        =      0.03000
      STDDST, STD.DEV. OF DEPTH TO GROUNDWATER    =      0.00000

      UNPORM, MEAN VADOSE ZONE POROSITY (-)       =      0.43000
      SUNPOR, STD.DEV. OF VADOSE ZONE POROSITY    =      0.00000

      PARNM, MEAN VALUE OF VG PARAMETER N (-)     =      2.68000
      SDPARN, STD.DEV. OF VG PARAMETER N          =      0.00000

      RESWCM, MEAN RESIDUAL WATER CONTENT (-)     =      0.04500
      RESWCS, STD.DEV. OF RESIDUAL WATER CONTENT  =      0.00000

ALFINM = 0, UNSAT DISPERSIVITY CALCULATED INTERNALLY
      ** SATURATED ZONE INPUT PARAMETERS **

      LAMBW, MEAN SAT. ZONE DECAY COEFF. (1/day)   =      0.00010
      SLAMB, STD.DEV. OF SAT. ZONE DECAY COEFF.    =      0.00000

      PORM, MEAN SAT. ZONE POROSITY (-)           =      0.20000
      STDPOR, STD.DEV. OF SAT. ZONE POROSITY      =      0.00000

      FOCM, MEAN SAT. ZONE ORG. CARBON FRAC. (-)  =      0.00048
      STDFOC, STD.DEV. SAT. ZONE ORG. CARBON FRAC.=      0.00000

      ALRLTM, MEAN DISPERS, RATIO LONG/TRANSV. (-) =      1.00000
      SALRLT, STD.DEV. OF DISP. RATIO LONG/TRANSV. =      0.00000

      ALRTVM, MEAN DISPERS. RATIO TRANSV/VERT. (-) =      1.00000
      SALRTV, STD.DEV. OF DISP. RATIO TRANSV/VERT. =      0.00000

      CONDS, SAT. HYDRAULIC COND. (m/day)         =      1.03000
      SCONDS, STD.DEV. OF SAT HYDRAULIC COND.     =      0.00000

      GRADS, HYDRAULIC GRADIENT (m/m)             =      0.02700
      SGRADS, STD.DEV. OF HYDRAULIC GRADIENT      =      0.00000

      HMEAN, MEAN AQUIFER THICKNESS (m)           =     23.40000
      STDH, STD.DEV. OF AQUIFER THICKNESS         =      0.00000
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  QINM, MEAN INFILTRATION RATE (m/day)        =      0.00100
  QINSTD, STD.DEV. OF INFILTRATION RATE       =      0.00000


  LOCATION OF RECEPTORS:

                X (M)           Y (M)           Z (M)
RECEPTOR( 1)     0.0             0.0             0.0
RECEPTOR( 2)     1.0             1.0             0.0
RECEPTOR( 3)     2.0             2.0             0.0
RECEPTOR( 4)     3.0             3.0             0.0
```